

CLAIMS

1. An auto-cycling plunger for use in lifting a fluid out of a well bore, the
5 auto-cycling plunger comprising:
 - a hollow, longitudinally extending body;
 - at least one first directional outer seal disposed on an exterior surface
 of said body for creating a seal between said body and a well bore and at
 least a portion of said at least one first directional outer seal extending in a
10 direction substantially parallel to a length of said longitudinally extending body
 such that said portion of said first directional outer seal is spread resiliently
 outwardly from said body with an applied pressure, thereby increasing the
 degree of sealing;
 - at least one second directional outer seal disposed on the exterior
15 surface of said body for creating a seal between said body and said well bore,
 at least a portion of said at least one second directional outer seal extending
 in a direction substantially parallel to said length of said longitudinally
 extending body and substantially opposite to the direction of said at least one
 first directional outer seal such that said portion of said second directional
20 outer seal is spread resiliently outwardly from said body with a second applied
 pressure thereby increasing the degree of sealing; and
 - a valve stem including a valve member, said valve stem extending
 through said longitudinally extending body and having actuable ends
 extending from said body, said valve stem operable to be shuttled between an
25 open position and a closed position,
 - whereby when said valve stem is in said open position, said valve
 member is longitudinally spaced from a valve seat on said body to allow fluid
 flow through the length of said body and when said valve stem is in said
 closed position, said valve member is seated on said valve seat, thereby
30 sealing said body and preventing fluid flow therethrough.
2. The auto-cycling plunger according to claim 1 wherein said plunger
 includes two first directional outer seals.

3. The auto-cycling plunger according to claim 2 wherein said plunger includes two second directional outer seals.

5 4. The auto-cycling plunger according to claim 1 wherein said body comprises a first end and a second end attached to a tubular middle portion, said first end, said second end and said tubular middle portion forming a continuous hollow body for fluid flow therethrough when said valve stem is in said open position.

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5. The auto-cycling plunger according to claim 4 wherein said at least one first directional outer seal and said at least one second directional outer seal are annularly disposed on said exterior surface of said tubular middle portion.

15 6. The auto-cycling plunger according to claim 5 wherein said valve member is a spherical ball coupled to said valve stem.

7. The auto-cycling plunger according to claim 6 wherein said valve seat is a semi-spherical recess at said second end of said body for receiving a
20 portion of said spherical ball when said valve stem is in said closed position.

8. The auto-cycling plunger according to claim 1 wherein said valve stem and said body include a biased detent system releasable indexing of said valve stem in said open and closed positions in said body.

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9. The auto-cycling plunger according to claim 8 wherein the biased detent system includes first and second longitudinally spaced annular grooves on said valve stem and said body includes a pair of inwardly biased protrusions biased into contact with said valve stem, said first annular groove
30 for receiving said biased protrusions when said stem is in said open position, said second annular groove for receiving said biased protrusions when said stem is in said closed position.

10. The auto-cycling plunger according to claim 9 wherein each of said inwardly biased protrusions comprises a ball and a spring for biasing said ball into contact with said valve stem.

- 5 11. In an auto cycling plunger, the use of:
- at least one first directional outer seal disposed on an exterior surface of a longitudinally extending body of said plunger for creating a seal between said body and a well bore, at least a portion of said at least one first directional outer seal extending in a direction substantially parallel to a length of said
 - 10 longitudinally extending body such that said portion of said first directional outer seal is spread resiliently outwardly from said body with an applied pressure, thereby increasing the degree of sealing; and
 - at least one second directional outer seal disposed on the exterior surface of said body for creating a seal between said body and the well bore,
 - 15 at least a portion of said at least one second directional outer seal extending in a direction substantially parallel to said length of said longitudinally extending body and substantially opposite to the direction of said at least one first directional outer seal such that said portion of said second directional outer seal is spread resiliently outwardly from said body with a second applied
 - 20 pressure thereby increasing the degree of sealing;